IJACT, Volume 2, Issue 5, 2024 ISSN: 2995-5378
http://medicaljournals.eu/index.php/IJACT

INTERNATIONAL JOURNAL OF ALTERNATIVE AND CONTEMPORARY THERAPY

Etio-Pathogenesis of Anaemia in Pregnancy

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Abstract: The mechanism of anaemia formation in pregnancy is usually associated with the imbalance between iron intake into the body, especially in combination with protein, folic acid, vitamin B12 deficiency, and their high consumption for plastic purposes.

Keywords: etiology, pathogenesis, anaemia, pregnancy.

Introduction. Anaemia in pregnancy is a decrease in haemoglobin levels that occurred during gestation and is pathogenetically related to it. It is manifested by weakness, rapid fatigue, dizziness, perversion of taste and olfactory preferences, cardiac pain, muscle weakness, paresthesias, mucosal lesions, changes in skin, nails, hair. It is diagnosed by means of general clinical blood tests and laboratory examination of iron metabolism. Iron-containing preparations, folic acid, cyanocobalamin are used for treatment, complex antihypoxic therapy is carried out according to indications.

The existence of physiological prerequisites for the occurrence of gestational anaemia (hydraemia) makes this disease one of the most common types of pathology in pregnancy. Manifest forms of the disease with clinically expressed symptoms in economically developed countries occur in 16-21% of patients, in developing countries their prevalence reaches 80%. At the same time, latent (latent) iron deficiency, taking into account the fullness of the diet, is observed in 50-100% of women by the end of pregnancy.

The predominant form of gestational anaemia is iron deficiency, diagnosed in 75-95% of cases. The relevance of timely detection of pathology is associated with a high probability of complicated pregnancy and the occurrence of hypoxic conditions against the background of physiological increase in oxygen demand by 15-33%.

Causes of anaemia in pregnancy

Insufficient haemoglobin and erythrocyte content in the blood of a pregnant woman is due to factors directly related to gestation, as well as well as previous diseases. According to the observations of specialists in the field of obstetrics, in most patients, gestational hydraemia has such easily explainable physiological causes as:

Increased iron requirement. Starting in the second trimester of pregnancy, more iron is required for adequate maintenance of the fetoplacental complex. This trace element is consumed at an accelerated rate by the growing foetus, enters the placenta, and is used to increase the total number of red blood cells circulating in a woman's blood. By the beginning of the third trimester, the daily requirement of the pregnant woman in iron is at least 4-6 mg, and at 32-34 weeks it is required at least 10 mg/day. Physiological haemodilution. During pregnancy, the volume of circulating plasma increases by 40-50 per cent and the volume of red blood cells by only 20-35 per cent. This is due to the increased need of the body in iron and plastic substances, with insufficient intake of which the rate of erythropoiesis does not match the rate of increase in CCA. According to WHO recommendations, the acceptable level of haemoglobin in pregnant women is reduced to 110.0 g/l, and haematocrit - to 33%.

The factor aggravating anemia in the postpartum period is the physiological loss of up to 150 ml of blood during childbirth, each 2.0-2.5 ml of which contains up to 1 mg of iron. Experts also identify a number of pathological causes that cause the disease. A decrease in the volume of red blood cells

(microcytic variant of anemia) with a corresponding drop in hemoglobin levels is observed in poisoning with industrial poisons (for example, lead), many chronic diseases (rheumatism, diabetes mellitus, peptic ulcer, gastritis, chronic infectious processes), sideroblastic anemia, thalassemia. This condition also occurs with iron deficiency due to insufficient meat in the diet and consumption of products containing non-heme forms of the trace element (plant foods, milk and dairy products).

Normocytic anemia with a reduced content of normal erythrocytes is more often observed in blood loss due to placental pathology, chronic renal failure, hypothyroidism, hypopituitarism, autoimmune hemolytic form of the disease, inhibition of erythropoiesis in the bone marrow. The macrocytic type of anemia with an increase in the volume of red blood cells is characteristic of folic acid and vitamin B12 deficiency, acute myelodysplastic syndrome, liver pathology (hepatitis, cirrhosis), alcohol dependence, reticulocytosis. Additional risk factors are the low material standard of living of a pregnant woman, frequent childbirth, multiple pregnancies, long breastfeeding with a short interpartum interval, complicated course of the present pregnancy (pronounced early toxicosis with repeated vomiting, gestosis).

Pathogenesis

The mechanism of anemia formation during pregnancy is usually associated with a violation of the balance between the intake of iron into the body, especially in combination with a deficiency of protein, folic acid, vitamin B12, and their high consumption for plastic purposes. An additional link in the pathogenesis is the inhibition of erythropoiesis due to an increase in the concentration of estradiol and the accumulation of metabolites that have a toxic effect on the bone marrow. The situation is aggravated by immunological changes associated with the constant stimulation of the mother's body by fetal antigens, which increases anti-tissue sensitization. The results of pathophysiological processes are tissue, hemic and circulatory hypoxia with metabolic disorders and further accumulation of harmful metabolic products.

Classification

The optimal criteria for the systematization of forms of anemia in pregnant women are the concentration of hemoglobin in the blood and the element or substance whose deficiency led to the onset of the disease. This approach to classification allows you to more accurately predict possible complications and select a pregnancy management scheme. Modern obstetricians and gynecologists distinguish the following forms of gestational anemia:

According to the severity: according to the WHO classification, taking into account the level of hemoglobin, the disease can be mild (90-109 g / l), moderate (70-89 g / l), severe (less than 70 g / l).

By type of deficiency: iron deficiency anemia is the most common (it occupies about 95% in the incidence structure), folic acid deficiency and B12-deficiency forms of the disease are less common.

Symptoms of anemia during pregnancy

The mild degree is usually latent. With a decrease in iron concentration of less than 90 g / l, signs of hemic hypoxia (actually anemic syndrome) and iron deficiency in tissues (sideropenic syndrome) become noticeable. The possible development of oxygen starvation is indicated by general weakness, dizziness, tinnitus, discomfort and pain in the precardial region, complaints of palpitations, shortness of breath during physical exertion. The mucous membranes and skin look pale. A woman becomes irritable, nervous, inattentive, her memory decreases, her appetite worsens.

Tissue iron deficiency is manifested by rapid fatigue, perverted taste (desire to eat plaster, chalk, clay, sand, minced meat, raw meat), thickening and fragility of nail plates, dryness and hair loss, muscle weakness, urinary incontinence due to weakening of the sphincter apparatus. In some patients, epithelial membranes are affected: cracks ("jams") appear in the corners of the mouth, the mucous membrane of the oral cavity becomes inflamed, complaints of itching and burning in the vulva area appear. With moderate to severe anemia, there is often a slight yellowness of the palms and nasolabial

triangle associated with impaired carotene metabolism in iron deficiency, and "blue" of the sclera caused by dystrophic processes.

Complications

The probability of pregnancy complications directly depends on the severity of the disorders and the time of onset of the disease. Anemia that developed before conception is especially unfavorable. In such cases, primary placental insufficiency, hypoplasia of the membranes, low location of the placenta and its presentation, early miscarriage, undeveloped pregnancy are possible. With the appearance of an anemic symptom complex in the II-III trimesters, the risk of gestosis, late miscarriages and premature birth, premature detachment of the normally located placenta increases.

With a severe course of the disease, myocardiodystrophy occurs, the contractility of the heart muscle worsens. As a result, hemic and tissue hypoxia are aggravated by circulatory, as a result, the parenchymal organs of the pregnant woman suffer, decompensation of their function is observed. In childbirth, 10-15% of women in labor show weakness of the labor forces, often there is abundant bleeding of the hypotonic type. After childbirth, 10-12% of maternity hospitals and 35-37% of newborns develop various purulent-septic processes. Hypogalactia is observed in 4 out of 10 nursing mothers.

The presence of anemia in a pregnant woman poses an immediate threat to the child. Perinatal morbidity in such pathology can increase up to 100%, and mortality — up to 14-15%. Fetoplacental insufficiency causes fetal hypoxia in 63% of cases, hypoxic brain injury in 40%, and developmental delay in 32%. Almost a third of newborns are born with asphyxia. Deficiency of vitamin B12 and folic acid causes abnormalities in the development of the spine and nervous system (spina bifida, etc.). In children whose mothers suffered from severe or severe anemia during pregnancy, the function of external respiration is worse established. In the postnatal period, they are more likely to lag behind in height and body weight, and are more prone to infectious diseases.

Diagnostics

The key tasks of the diagnostic search in case of suspected anemia during pregnancy are considered to be the assessment of the severity of the disorder and the timely detection of complications. Since anemia is iron-deficient in most cases, laboratory methods for determining the level of iron and hemoglobin are the most informative for diagnosis:

A general blood test. The hemoglobin content is less than 110 g/l. The color index has been reduced to 0.85. The number of red blood cells is below 3.5 x 1012 cells/l. There are signs of microcytosis (a decrease in the diameter of red blood cells less than 6.5 microns). Poikilocytosis and anisocytosis are possible in the morphological picture of erythrocytes.

The study of iron metabolism. The serum iron level is less than 12 mmol/l. The total iron binding capacity of serum (OGSS) has been increased to 85 mmol/l or more. The concentration of ferritin (less than 15 mcg/l) and iron saturation of transferrin (less than 16%) were reduced. The latent iron binding capacity of the blood (LVSS) has been increased.

To exclude B12-deficient and folate-deficient variants of anemia that occurred during pregnancy, serum levels of cyanocobalamin and folic acid are determined. Taking into account possible complications from the fetus, it is recommended to assess its condition in dynamics with fetometry, cardiotocography, phonocardiography. Differential diagnosis is carried out between different forms of the disease, hemoglobinopathies, anemia syndrome caused by pregnancy complications, and extragenital pathology.

Treatment of anemia during pregnancy

The main objectives of therapy in pregnant women with reduced hemoglobin are correction of iron deficiency, elimination of hypoxia, stabilization of hemodynamics and metabolism. In moderate to severe anemia, special attention is paid to supporting the adequate functioning of the fetoplacental complex. The treatment regimen includes medications that allow:

To restore the hemoglobin content. In iron deficiency anemia, oral administration of optimally high doses of iron in a divalent form convenient for assimilation is recommended. Preferably, the use of depot preparations with a slow release of the element. Parenteral correction of anemia is performed with intolerance to divalent iron taken orally, impaired absorption of the gastrointestinal mucosa, aggravated peptic ulcer of the stomach or duodenum. Ascorbic acid is prescribed for more effective absorption of the trace element. WHO experts recommend supplementing the intake of iron-containing drugs with folic acid, which prevents the development of folic deficiency anemia. Cyanocobalamin deficiency is the basis for parenteral administration of vitamin B12.

Eliminate the effects of hypoxia. In order to ensure an adequate supply of oxygen and nutrients to the fetus, various elements of the uteroplacental blood flow system are comprehensively affected. To enhance blood flow to the placenta, tocolytics are used to relax the uterine wall. Microcirculation can be improved with the help of angioprotectors and drugs that affect blood rheology. The appointment of membrane stabilizers, anticosidants, actovegin allows to increase the resistance of the fetus to hypoxia. Antihypoxic therapy is usually used for II-III degrees of anemia complicated by fetoplacental insufficiency. If necessary, drugs are used to correct metabolic acidosis and improve the cardiac activity of a pregnant woman.

Antianemic therapy is usually long-term, it allows you to completely normalize red blood counts only at 5-8 weeks of treatment. To increase the effectiveness of medicines, diet correction is mandatory. It is recommended to supplement the diet with foods rich in iron: beef, veal, lean ham, pork, beef, chicken liver, fish. It is necessary to reduce the amount of food that impairs iron absorption: cereals, bran, soy, corn, tea, coffee, milk, carbonate, bicarbonate, phosphate mineral water. Almagel, tetracyclines, magnesium and calcium salts, which can worsen anemia, are prescribed with caution.

Conclusions: Thus, mild anemia, diagnosed in most pregnant women with reduced hemoglobin levels, does not pose a threat to the life of the mother and fetus. Timely correction of moderate and severe forms of the disease can significantly improve blood counts and prevent the development of complications. To prevent perinatal and maternal complications, a balanced diet, early administration of iron preparations to patients with a history of menorrhagia, a short interval between childbirth, prolonged lactation after previous childbirth, and multiple births are recommended. Women with anemia should be given increased attention during childbirth to quickly identify and correct possible labor disorders, postpartum bleeding.

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